

Implementation of the educational program on diabetes mellitus type 2 for nurses primary health care.

Abduzhapparova Akbota

Master's thesis

August 2019

Social services, Health and Sports

Degree Programme in Advanced Nursing

Practice

Author(s) Abduzhapparova Akbota	Type of publication Master's thesis	Date August 2019 Language of publication: English
	Number of pages 62	Permission for web publication: x
Title of publication Implementation of the educational program on diabetes mellitus type 2 for nurses primary health care.		
Degree programme master's degree programme in nursing		
Supervisor(s) Hanna Hopia, PhD. Ospanova Dinara		
Assignedby		
<p>Abstract</p> <p>Currently, diabetes type 2 is a huge problem in Kazakhstan. The number of persons with diabetes type 2 is increasing rapidly. This means that the success of treatment in most cases depends on the patient themselves. The challenge concerning the diabetes type 2 in Kazakhstan is that nurses perform only assistance in medical appointments, and do not necessarily carry out independent nursing practice to guide patients with diabetes type 2. The purpose was to improve the knowledge of primary health care nurses in order to take care of patients with type 2 diabetes through the implementation of a new educational program. Development work was used applying Benner's model "From Novice to Expert. Work was carried out in one of the polyclinics of the city of Turkestan. The sample consisted of 20 nurses. The educational program for the nurses who take care of the patients with diabetes 2 was developed. The group of nurses participated in an educational intervention program. The educational program has a duration of 5 days for 2 hours per day. The main content of the program is to improve the quality of nursing care for patients with type 2 diabetes. The pre-posttest was used to measure the knowledge about diabetes of the participant-nurses. The results showed that knowledge level of the participant nurses were better than before the training. In addition, participant nurses opinions indicated that they experienced the educational program was useful for them. This development work showed that even the short educational intervention can be useful for the nurses to increase their knowledge on diabetes type 2. This is important because it is nurses' task to maintain and ensure the health of the population and improve the quality of life of the patients by providing nursing care. Therefore, nurses need to improve and replenish their knowledge and skills concerning self-management of diabetes type 2.</p>		
Keywords/tags (subjects) Nurse, diabetes type 2, education, nursing, competence, knowledge, training		
Miscellaneous (Confidential information)		

Contents

1	Introduction	4
2	Background	5
	2.1 Diabetes type 2	5
	2.2 Situation in Kazakhstan Diabetes type 2.....	6
	2.3 Educational program for nurses about diabetes type	7
3	Purpose and Objectives	10
4	Methodological approach of the development work	11
	4.1 Framework for the development work	11
	4.2 Participants	12
	4.3 Development of the educational program.....	13
	4.4 Pre- and posttest for the nurses.....	15
	4.5 Collecting feedback.....	18
5	Results	20
	5.1 Educational program on diabetes 2 for nurses.....	20
	5.2 Results of the pre- and post tests.....	21
	5.3 Nurse-participants' feedback on the educational program.....	23
6	Discussions	23
	6.1 Limitations of the development work.....	274
	6.2 Ethical issues in development work	25
7	Conclusions	25
	References	27
	Appendices	31
	Appendix 1. Interview questions.....	31
	Appendix 2. Questions for pre-post test.....	31
	Appendix 3. Manual.....	32

Acknowledgement.

We thank the experts in nursing who participated in the creation of the guide to type 2 diabetes in Kazakhstan.

1. Zhetmekova Zhuldyz Turehanovna – assistant of the Department of propedeutics of internal diseases of SSMU.
2. Alibaeva Gauhar Ashatovna – head. Department of applied bachelor of West Kazakhstan Higher medical College.
3. Abduzhapparova Akbota Suleimenovna – teacher of Nursing "Multidisciplinary graduate medical College of Turkestan".
4. Alibaeva Gulsim Nurmagambetovna – Chief nurse Kasniji. Almaty city
5. Boshenyatov Olga Viktorovna - head nurse of the SCE on PVC "Regional clinical hospital", Oral.

We thank you for the opportunity to perform the project work. Well-structured topical topics on diabetes mellitus type 2 training program for nursing students were taken from this guide.

Abbreviations

DT2 – Diabetes type 2

WHO – World Health Organization

DM – Diabetes mellitus

MNT - Medical Nutrition Therapy

VHA - Veterans Health Administration

1 Introduction

Type 2 diabetes (DT2) is a chronic disease that is determined by high blood glucose levels, a decrease in the sensitivity of body tissues to the action of insulin. Type 2 diabetes (D2) is associated with an increase in secondary diseases, from cardiovascular diseases causing stroke, amputation of the lower limbs, etc., renal failure, reduced vision, leading to blindness. (Algenstaedt, Stumpenhagen & Westendorf 2018, 1-10).

Type 2 diabetes (DT2) is a global public health problem that is constantly growing worldwide. In 2014, an estimated 422 million adults were living with the disease. (Amer, Mohamed, Elbur, Abdelaziz & Elrayah 2018, 1-8). The study Haslam and James (2005) reported about 90% of people with T2DM are obese or overweight. (Svenningsson, Marklund, Attvall & Gedda, 2011).

According to the WHO global report on diabetes (2016) around the world, according to estimates, in 2014 422 million adults lived with diabetes in comparison with 108 million in 1980. The global prevalence (standardized on age) of diabetes almost doubled since 1980, having increased from 4.7% to 8.5% among adult population. Type 2 diabetes increases the risk factor, such as overweight or obesity. For the last decade the prevalence of diabetes grew quicker in the countries with the low and average level of income, than in the countries with high income level. Diabetes became the reason 1.5 million cases of death in 2012. Higher level of glucose in blood caused additional 2.2 million cases of death, having increased risk of cardiovascular and other diseases. Forty three percent these 3.7 million death occur aged up to 70 years. The percent of death connected with the high level of glucose in blood or diabetes which occurs up to 70 years is higher in the countries with the low and average level of income, than in the countries with high income level.

Nurses of public health care as the main members of cross-disciplinary group play an important role in prevention and treatment of chronic diseases, such as cardiovascular diseases, diabetes, respiratory diseases and cancer. Long Wook (2005)

indicates that nurses are on the first line and are the most tried and tested means of communicating with patients, and in most cases they are in the best situation to collect data on patient families, both effective social and economic factors in the development of intervention plans. (Zandiyeh, Hedayati & Zare, 2015).

2. Background

2.1 Diabetes type 2.

The International diabetic Federation of Belgium (2013) reported diabetes is one of the most widespread metabolic diseases affecting most of world's population (Hameed, Masoodi, Mir, Nabi, Ghazanfar & Ganai, 2015). After a hospital stay, patients often face additional issues with diabetes care. Some patients are put first diagnosis of diabetes, while for some, the diagnosis has been made, and they will have a tailored treatment plans. Those patients who have previously taken oral antihyperglycemic drugs may start insulin injections or change their monitoring, movement or eating plans, which requires extensive education so that patients can independently monitor the condition after discharge from the hospital. (Krall & Donihi, Hatam, Koshinsky & Siminerio,2016). According to the Association of Diabetes center for 2013 and authors Selby, Ray, Zhang, Colby (1997) people living with diabetes will be more likely to be hospitalized and arrive long term in hospitals than people without diabetes. As the share of the hospitalized patients with diabetes grows in combination with growth of incidence of diabetes among the population in general recently, these indicators can grow . The American association of diabetes (ADA) recommend that stationary programs specially included training of personnel and training of patients in self-checking. (Yang, Dall , Halder, Gallo, Kowal & Hogan, 2013).

In work Pangi and Reddy KS, Prabhakaran, Chaturvedi, Jeemon, Thankappan, Ramakrishnan (2006) argue that the incidence of diabetes is increasing by about 6% per year, and also predicts that by 2030 the largest number of diabetics in the world will reach 9.40 million And diabetes has become the most serious problem in the

world, as mortality has increased by 35% (Pangi, Gudivada, & Lashmi, 2016, 103–111).

Care of diabetes includes monitoring and management of symptoms, observance of schemes of care, maintenance of a healthy lifestyle and management of influence of a state on daily functioning, emotions and the social relations. More than 95% of care of diabetes are performed by patients who have to have the corresponding knowledge and skills of self-checking. As many patients need knowledge and skills for implementation of necessary self-checking, programs of training of patients became an integral part of treatment of diabetes. (Laursen, Christensen & Frolich. 2017, 1039-1047).

The prevalence of diabetes and the growing elderly population in many societies means that the number of elderly people with diabetes will increase in subsequent years (Kirkman MS, Briscoe VJ, Clark N, Florez H, Haas LB, et al. Diabetes in older adults. Consensus report Diabetes Care. 2012.)

Elderly people with diabetes may experience more problems in managing self-care required by diabetes, due to increased physical and cognitive problems, thereby increasing the need for home care services and a nursing home. (Haugstved, Igland, Aarflot & Landbakk 2016, 2-9).

2.2 Situation in Kazakhstan about diabetes type 2.

Diabetes mellitus in Kazakhstan is allocated to the rank of socially significant diseases that require systemic solutions and state response measures.

According to the statistics of the state registration in the period from 2004 to 2014, the prevalence of diabetes in the Republic of Kazakhstan increased from 114 355 to 244 541 people, which amounted to 130 186 people (an increase of 113.8%).

According to projections, given this rate of growth, by 2024, the number of patients will increase to 525 763. In recent years, Kazakhstan has seen a sharp increase in the incidence of diabetes and tends to further increase, primarily in the age groups over 40 years. Every 10-15 years, the number of patients with diabetes doubles. This is mainly due to the increase in patients with type 2 diabetes, accounting for about 6-7% of the total population. (Sabirova, 2013).

What will give us educational programs for type 2 diabetes for nurses: 1-advanced knowledge and skills in counseling patients with diabetes. 2-Understanding, able to determine the tactics of treatment and care.3-Having skills in different areas of management of people with diabetes. 4-advanced knowledge of self-control (Healy, Black, Harris & Lorenz, 2013). The nurse must consider the patient's problems when developing a care plan (Bowen & Rothman, 2012). In the diagnosis of type 2 diabetes, education should be adapted to the person and his treatment plan. Diet and physical activity plans should be considered. Based on the recommendations of the patient for treatment and monitoring may be required such topics as the identification and treatment of hypoglycemia, clarification of the results of measuring the glucose level, reduced risk, etc. assist Patients in developing personal learning plans and self-government in cooperation with patients and their physician. Depending on the qualifications of the diabetes teacher or the person performing these steps, special referrals to a dietitian for an MNT, mental health provider, or other specialist may be required. (Powers, Bardsley, Cypress & Duker 2016,70–80).

2.3 Nurses' knowledge about diabetes.

Nurses bear heavy responsibility for providing necessary information for diabetics that the patient could live qualitatively (Rubin, Moshang & Jabbour, 2007). Therefore the nurse has to possess rather good knowledge to provide achievement of this purpose. Well-structured training of patients with diabetes was defined as excellent means of the help to the patient with diabetes in achievement of qualitative life

without complications (Peter, Hutchinson, MacKinnon, McIntosh, Cooke & Jones 2001). The content and context of diabetes patient education has been a major challenge faced by nurses. Also there is information, that in some reviews nurse has shown bad knowledge about diabetes. (Unwin, Gan & Whiting, 2010. (Oyetunde & Famakinwa 2014.)

It was found that in one study with Australian nurses, it was noted that they knew pathophysiology well (88%), blood glucose tests (87%), nutritional requirements (79.5%) and insulin administration (93%). But the knowledge of the correct periods of action and storage of insulin was bad (Hollis, Glaister & Lapsley, 2014).

Nurses who are responsible for assistance to elderly people with diabetes face some problems in the practice which, further, affect their ability to render the high-quality help. Some nurses have more knowledge of diabetes, others - have less. (Hausken & Graue 2013).

A diabetic patient needs diabetes education, and nurse teachers can help, as nurse teachers are health professionals whose practice is to educate people with diabetes to influence the expansion of knowledge about diabetes. (Funnell, Tang & Anderson, 2007).

2.4 Educational programs for nurses about diabetes type 2.

Educational activities have been identified as affordable and effective interventions to improve adherence among people with diabetes (Williams, Walker, Smalls, Campbell & Egede, 2014). Counselling, individual information and training activities have shown effective improvement in treatment adherence and glycemic control, such as activities based on consultation by the health clinic, policy advice, telephone

counselling and individual training provided by health professionals (Kusawadee, Virat, Nisana & Aratchaporn, 2014).

Counselling, individual information and training activities improve diabetes management. (Supachaipanichpong, Vatanasomboon, Tansakul & Chumchuen, 2018.)

Training in diabetic self-checking provides a basis for self-service and helps the people living with Diabetes to be guided with daily decisions and actions (Norris, Engelgau & Narayan, 2001; Siminerio, Ruppert & Gabbay, 2013;

Robbins, Thatcher, Webb & Valdmanis, 2008; (Duncan, Birkmeyer, Coughlin, Li, Sherr & Boren, 2009).

It was shown that training in diabetic self-checking improves results concerning health and reduces the right to the help and expense in hospitals. Management and formation of diabetes - multidisciplinary approach. The education provided to the patient has to be joint. It has to be made by the nurse. Education has to focus on teaching the patient to change behavior clinically to improve their state of health. When the nurse competently trains the patient with type 2 diabetes, the patient expands the knowledge of self-checking. (McCulloch 2013.)

In 2012, Albany Stratton Medical center a multidisciplinary team consisting of a nurse practitioner from the primary health care and diabetes clinic, a registered dietitian, patient education specialist, pharmacist and disease prevention program Manager was assembled to work on a new diabetes education process. VHA-approved training materials for patients with diabetes were reviewed to select those that match best practice. The creation of a new standardized diabetes education process based on nursing in the primary health care system has led to a significant improvement in glycemic control in the facility. (Mendez, Ashar Ata, Joanne M. Rourke, David Greenawalt & Jorge Calles-Escanda, 2016.) The lack of knowledge of nurses led to the

fact that patients received inadequate medical care (Chan & Zang, 2007). The higher the educational level of nurses, the greater the level of knowledge of nurses on diabetes (El-Deirawi & Zuraikat, 2001). Self-management of diabetes is an important diabetes treatment. Many diabetes patients in the United Arab Emirates (UAE) do not have enough knowledge about their illness due to illiteracy (Al-Maskari, El-Sadig, Al-Kaabi, Afandi & Nagelkerke, 2013).

In Kazakhstan, the load on the doctor is very high, and qualified nurses could take care of the care and consultation. In addition, the modernization of the health care system in Kazakhstan, associated with the growing population and the need to introduce new approaches to the treatment, prevention and rehabilitation of patients, places new demands on the level of training and competencies of nurses. (Kasymzhanova, 2015.)

To do this, it is necessary to develop educational program for nurses on type 2 diabetes, to improve the professional knowledge, skills, professional and personal qualities of nurses, which provide an internal willingness to carry out professional activities.

3. Purpose and objective

The purpose of this study is to improve the knowledge of primary health care nurses in order to take care of patients with type 2 diabetes through the implementation of a new educational program.

Objectives are as follows:

1. To develop and implement the educational program for type 2 diabetes nurses working in polyclinic conditions.
2. To collect feedback from the participating nurses about the educational program.

3. To describe the knowledge of the participating nurses about type 2 diabetes by using pre- and post-test.

4 Methodological approach of the development work

4.1 Framework for the development work

Development work was used to plan and create a training program for the nurses. The aim of the training program was to improve the knowledge and skills of primary health care nurses about type 2 diabetes. The development work approach was suitable for this work because the aim was to develop an educational intervention for the nurses in order to increase their competence of type 2 diabetes.

The model for the development work used was created by Benner (Benner 1982). The model is titled "From Novice to Expert" (Benner, 1982; Jasper, Rosser & Mooney, 2013). Benner assures that during the acquisition and development of skills nurse goes through five levels of skills: beginner, advanced beginner, competent, experienced, and expert. Novices have no experience with type 2 diabetes. Novice practitioners are also taught rules to guide actions regarding various attributes. The behavior of a novice nurse is limited and inflexible. A novice cannot use personal opinion in relation to type 2 diabetes since novices have no experience with type 2 diabetes. An advanced beginner is one who can demonstrate marginally acceptable performance. Experience has been gained in situations with type 2 diabetes to recognize repetitive significant components. An advanced beginner can formulate recommendations for action in terms of attributes and aspects. Competence, worked at the nurse's position two-three years, the nurse begins to see the actions in terms of the long-term purposes or plans. A beginner receives prospect from planning of own actions on the basis of conscious, abstract, and analytical thinking and helps to reach bigger efficiency and organization. The nurse consciously realizes these plans

and the purpose what attributes and aspects of the current and future situation with type 2 diabetes should be considered the most important and what less so. A proficient nurse perceives situations as a whole. Experience teaches the proficient nurse what typical events to expect in a situation with type 2 diabetes and how to change plans in response to these events. At the expert level, the experienced nurse, with his / her extensive experience, intuitively understands every situation. It is much more than experience. The expert acts, proceeding from understanding of a situation with type 2 diabetes. Benner's model was used in working with nurses on how they approached the situation with type 2 diabetes, offering ways of understanding and decision-making. An experienced nurse in the cardiology department may not be suitable to the level of an expert on type 2 diabetes. The Benner model allows you to assess the skills and attributes of nurses and identify professional development needs within the training, including the idea of transferability of the stages of the acquisition of knowledge and skills between different clinical environments. (Benner, 2011).

http://currentnursing.com/nursing_theory/Patricia_Benner_From_Novice_to_Expert.html

The development of the educational program described here for type 2 diabetes reflects the improvement of knowledge, potential readiness to solve problems, knowledge of the essence of the problem, and the ability to solve it. In addition, it reflects constant updating of knowledge, possession of new information for the successful application of this knowledge in specific conditions, that is, possession of operational and mobile knowledge of nurses. It is obvious that development is a continuous process, and it is essential to ensure that nurses develop their knowledge continuously. For these reasons, Benner's model was chosen as the framework for the development work. Benner's model explains that nurses develop skills and understanding of patient care over time from a combination of a strong educational foundation and personal experience. The Benner model can be applied in all areas of nursing. Model Benner looks at the education and development of nurses and how they are from beginner to expert. Benner's model is to keep experienced nurses at expert levels by constant training.

4.2 Participants

Work was carried out in "one polyclinic" of Kazakhstan with the attached population of 6,000 people. The number of staff is 100 people. The clinic's management has asked nurses, who are considered important professionals in the workplace, who have knowledge and skills in communication, counseling, education and have experience in caring for people, to take part in the development work. Some of the nurses involved were previously interested in diabetes care. Nurses did not attend special training sessions on type 2 diabetes. Participants in the work consisted of 20 nurses. All nurses graduated from medical college with secondary nursing education. Inclusion criteria for participation in the study included: 1) graduates of medical colleges; 2) practical work in the polyclinic (clinic, hospital) for at least one year including direct patient care. The age of the participants ranged from 23 to 55 years, experience from one year or more. Participants were recruited on the basis of their willingness to participate in the project. Participants were orally informed that participation in the project implies their informed consent. The participants were guaranteed confidentiality of the data collected in the course of the project.

4.3 Development of the educational program

Diabetes is a global health problem. Many scientific studies show that nurses' knowledge of diabetes is weak and that there is a need to improve their knowledge to effectively manage patients with type 2 diabetes. (Ahmed, Jabbar, Zuberi, Islam & Shamim 2012). The educational program was based on the manual "Type 2 diabetes" for Kazakh nurses. Topics were taken from the Kazakhstan guide to type 2 diabetes for nurses, 2018. The educational program was developed on the basis of the "Handbook of diabetes" by Richard Holt and co-authors. The title handbook "What you need to know about type 2 diabetes" Queensland diabetes. Books "Textbook of Diabetes" and "What you need to know about type 2 diabetes"

Queensland diabetes in open mode, provides full open access to its materials on the Internet for its users, making it easy to find. Used books to develop training material on type 2 diabetes are available (mobility). Books can be provided to the user on any device (phones, tablets). Books are available not only for people living with type 2 diabetes, but also for relatives of patients, nurses, and doctors. These books present very important materials on type 2 diabetes. Also, articles from the CINAHL database were used for the development of the educational program. Articles included were: "Diabetic foot care: prevention is better than cure" by author Beverley Meaney; "Subjects' experiences of a nutrition education programme: a qualitative study of adults with type 2 diabetes mellitus living in a rural resource-limited setting in South Africa" by authors Jane Muchiri, Gerda Gericke, Paul Rheeder; "Dietary management of older people with diabetes" by Jane McClinchy; "Multicomponent Exercise Improves Hemodynamic Parameters and Mobility, but Not Maximal Walking Speed, Transfer Capacity, and Executive Function of Older Type II Diabetic Patients" by authors Hélio José Coelho Junior, Iris Callado Sanches, Marcio Doro, Ricardo Yukio Asano, Daniele Jardim Feriani, Cayque Brietzke, Ivande OliveiraGonçalves, Marco Carlos Uchida, Erico Chagas Capeturo and Bruno Rodrigues.

The educational program was based on three main principles. Development training advanced training of nurses, self-efficacy and expected results in dealing with diabetic patients. The educational program gave nurses the opportunity to express themselves and interact with other nurses. Individual approach allows for the uniqueness of each individual: a combination of integrative qualities, inclinations, abilities, strengths of character, type of temperament, self-management, behavior and activity, and attitude. Individual approach of the teacher takes into account the interests of each student. This will create a safe and comfortable environment during training.

The basic principles of the training program are improving the professional authority of nurses who will confidently play a leading role in providing quality medical care to patients with type 2 diabetes and improving communication within a multidisciplinary work environment and between primary health care professionals and services.

Reflections based on patients' experiences and perceived challenges that nurses face in clinical practice will help build consensus on the implementation of the guidelines.

These principles are based on the ability to manage reputation, to communicate with patients, to establish contacts and partnerships, emotional self-control (stress management), the ability to take responsibility, empathic potential, and diction and vocabulary (clarity and richness of speech) since communication skills are important in terms of good health and greater patient satisfaction. The development of educational program contributes to the development of personal qualities of nurses and to the formation of professional competence. The programme is based on the potential of the approach to facilitate communication and knowledge sharing among health experts.

4.4 Pre- and post-test for the nurses

One of the objectives was to describe the knowledge of the participants about type 2 diabetes by using pre- and post-test. This test was compiled by the author Amy Hess-Fischl. The test is convenient and available for everyone. There is no framework for the answers, and when passing the test, there are same opportunities for all subjects. This work included a pre-test, educational, and post-test seminar. The development was carried out as follows: Questions to determine the knowledge of nurses were presented before and after training (pre-test and post-test questionnaires, see Appendix 2)

Questions for pre- and post-test

One correct answer equaled 1 point, an incorrect answer 0 point. Minimum score for all questions was 0, maximum 10. Tests for carrying out the pre- and post-test were used from endocrineweb. The author of the questions is Amy Hess-Fischl but the questions were paraphrased. The website is open access, and both nurses and patients with type 2 diabetes can use it.

The Test questions and correct answers

Table 1.

1	What is type 2 diabetes?	Type 2 diabetes mellitus (DM) is a metabolic non-infectious chronic disease characterized by chronic hyperglycemia, developing as a result of impaired insulin interaction with tissue cells. It affects both men and women, most often over the age of 40 years.
2	What are the symptoms of type 2 diabetes?	poor wound healing, the weakening of the immune system, pain and swelling in the limbs, headache, dermatitis, malaise, fatigue
3	Insulin in type 2 diabetes?	In type 2 diabetes, β -cells produce insulin, but, firstly, it is poorly perceived by the body's own tissues, and secondly, β -cells of a patient with type 2 diabetes produce insulin worse than in a healthy person, and over time insulin production worsens. Insulin treatment is used in a number of situations for people with type 2 diabetes.
4	Can diabetes be cured?	Treatment of type 2 diabetes is reduced to the control and adjustment of blood sugar levels, prevention of complications. Type 2 diabetes is a chronic disease for life, it cannot be cured.
5	What is type 2 diabetes care?	The nurse has extensive knowledge and experience in teaching, communication, and consultation of patients with diabetes, the treatment of this disease and the skills of scientific research.
6	Is it possible to be engaged in physical activities with type 2 diabetes?	Physical activity directly, and not only through weight loss, has a positive effect on the main defect in type 2 diabetes – reduced insulin sensitivity. Exercise has a general health-improving effect, improving the quality of life, reducing the risk of cardiovascular disease and mortality from them. Before planning physical activities, it is

		necessary to discuss the details with your doctor.
7	What kind of complications are people with diabetes type 2 susceptible to?	Potential complications: Heart disease; Stroke; Amputation — usually the lower limbs (legs and feet); Vision loss; Hearing impairment; Bladder and kidney infections; Erectile dysfunction and impotence.
8	What is diabetic foot?	This is a terrible complication of diabetes, which is observed in most patients with insufficient control of blood glucose (insufficient treatment of diabetes). At the same time, diabetics should know and follow a few simple rules for foot care, which will help prevent the development of gangrene and limb loss.
9	How can a patient control blood sugar levels?	Measuring blood glucose, also known as self-monitoring of blood glucose, is a way to check how much glucose (sugar) is contained in the blood of a diabetic patient with a glucometer anytime, anywhere. Normal blood glucose values for people without diabetes are fasting 3.3 to 5.5 mmol, 5.6 to 6.6 mmol/l is the norm after meals.
10	What is hypoglycemia and first aid for hypoglycemia?	Timely first aid for hypoglycemia can stop the onset of an attack. The patient in the mind should immediately be given to take any sweet drink or sweet product containing a lot of carbohydrates. Best suited: 200-100 ml fruit juice (e.g., grape) or 2 teaspoons of honey or 2 slices of sugar, or 2-3 drugs. If after 10-15 minutes after assistance to improve the quality it is necessary to repeat all the steps again, wait also 10 - 15 minutes.

Participants passed the test consisting of 10 questions before studying the same set of questions concerning comprehensive knowledge of type 2 diabetes, symptoms, complications, and first aid for type 2 diabetes. In 30 minutes in a pre- and post-test I checked availability of test material (the list of groups, handles): checked readiness of the room to pre-and to post-testing; checked attendance of nurses before and after the test in time; and held the test in a quiet, light room. As the teacher, I watched each nurse before and after the test, which was easy as 20 nurses were divided into two groups. In each group there were about 10 nurses. Observance of requirements to the pre- and post-test was monitored closely. Completed pre-and post-tests were stored in a case in my private office in college.

4.5 Collecting feedback about the educational program

Interviews were conducted with the nurses to obtain feedback about the educational program. (Appendix 1). The purpose of the interview was to collect nurses' opinions about the educational program. The interview was held in a focus group. The focus group allows to use the effect of group dynamics which guarantees the high involvement of respondents who during the discussion reasons and proves the position. The focus group allows to collect the widest range of opinions on a matter of concern. (Krueger, 2002.) In a focus group, the moderator works with a group of people with some common interests or characteristics which interact with each other. The moderator uses group dynamics and interactions for obtaining information on the concrete or focused problem. The group "is focused" as it includes collective activity, such as discussion, conversation with each other, determination of questions for each other and commenting of others experience and the points of view on a question. (Doody, O., Taggart, L. & Slevin, E. 2013).

1. What experience does this training represent for you?
2. What do you feel about this training? Your opinions?
3. Adequacy of teaching materials?

4. What was useful? Strengths and weaknesses of learning?

5. What would you suggest?

A focus group interview is a structured discussion in a small group that is designed to reach consensus. This process is encouraged and used to prevent one person from dominating the discussion; it encourages all group members to participate and leads to a set of priority decisions or recommendations that represent the group's preferences. Focus group interviewing is a means of gathering data among a group of people who are interested in a particular topic. (Dilshad & Latif 2013). Through discussions and interactions, participants share their experiences and perceived issues with each other. Twenty nurses took part in the survey, in two groups of 10 nurses. The interview was held in a quiet, confidential and bright room, without the presence of strangers in a convenient place for the respondents. The focus group interview was performed immediately after the intervention ended. The focus group interview was performed by the author of this master's thesis, acting as an interviewer. The purpose of this work consists of defining subjects which are important and to use these subjects for the solution of problems in relation to type 2 diabetes. (Clarke & Braun, 2013).

Questions for holding the interview (Appendix 1) were used from the website the Center of diabetes of Joslin (<https://www.wisdomjobs.com/e-university/diabetes-interview-questions.html>) but were paraphrased. The Joslin diabetes center is known for its extensive experience in diabetes review and research. The goal of the Joslin diabetes Center is to find a cure for diabetes and ensure that people living with diabetes have had a long and healthy life. Major historical discoveries and improvements in attitudes and diabetes care have been developed around the world at the Joslin diabetes center.

5 RESULTS

5.1 Development and implementation of educational materials for type 2 diabetes nurses working in polyclinic conditions

The professional activity of nurses is to maintain and ensure the health of the population, improve the quality of life by providing qualified nursing care, preventive work with the population, ensuring the organization of nursing staff. The objects of professional activity of nurses are the patient and his environment, the population, and nursing staff. Therefore, nurses need to improve and replenish their knowledge. In the groups, the joint education of nurses of all ages was carried out in accordance with the educational program of optional education adapted for nurses. A type 2 diabetes education programme has been prepared for nurses to work with the right to make independent decisions in the planning, implementation, and effectiveness of care activities for patients with type 2 diabetes. Educational programs are an effective means of improving the knowledge and attitudes of nurses. The educational program is designed in accordance with its educational purpose in relation to stakeholders, the environment, and the educational program. The success of this approach to learning contributed to the colour photo and relevance of the material used. The nurses' participation in the discussion was valuable. One could clearly see the nurses' interest and satisfaction. The implementation of the educational program for type 2 diabetes nurses should be given the right to make independent decisions on the planning and organization of patient care, monitoring his condition within the nursing process, teaching a healthy lifestyle, self-care, adaptation of the patient to his disease, psychological support of the patient, and his relatives.

An educational program on self-management of diabetes was developed. Each educational intervention is limited to a group of 10 nurses and lasts five days for two hours. A printed educational program, including color pictures and videos, were used to concretize the concepts of the participants during the educational intervention. The topic areas that were covered for the education session included: emergency care with hypo-and hyperglycemic coma, self-control, exercise and nutrition, complications, and diabetic foot.

The topics in the educational program were compiled by topics from the type 2 diabetes guide. The educational process took place from 19 to 23 November. Twenty nurses were divided into two groups. Classes were two hours a day, and the total number of hours is 10 hours. The methodology of the educational process was classified into Verbal and Visual. Verbal - explanation, story, lecture, conversation, discussion on topics. Visual - illustration, demonstration, observation of students, videos. Classes were held in a classroom with an interactive whiteboard. During the training, the nurses had different kinds of questions. After explaining the topics, the participants had discussions using the method of active learning, based on the discussion of the problem, the purpose of which is to clarify and compare different points of view, finding the right solution to a controversial issue.

The educational program is made for 5 days for 2 hours at a time. The training was conducted after working hours. Twenty nurses are divided into two groups of 10 nurses each. Each session was planned to take into account their emotional mood, propensity to individual work, or classes in a small group.

5.2 Results of the pre- and post-tests

One of the objectives of this study was to describe the knowledge of the participating nurses about diabetes type 2 by using pre- and post-test. The level of nursing knowledge influences the quality of care and patient health. Competent nurses improve the effectiveness of the country's health care system as a whole. The result of the activities of nurses is the health of the patients, which is largely determined by the working conditions and the state of health of the staff. Preliminary test results showed that the nurses participating in the study lacked knowledge of type 2 diabetes; they usually listed symptoms of diabetes, but there was no known difference between type 1 and type 2 diabetes. Every nurse knew the normal blood glucose level and how to measure glucose levels. They knew the definitions of hypo-

and hyperglycemia, they can provide first aid, but nurses do not follow the sequence of first aid for coma. During the preliminary testing, nurses demonstrated insufficient knowledge of type 2 diabetes. Minimum score was 4 while maximum was 7. Average score for all participants-nurses were 5.5. After the education, minimum score increased, and two participants answered six questions correctly. Maximum score was 9. Average score for all participants after the education was 7.8.

Table 2 Test results of pre-post-test



The post-test results were impressive, and noticeably during training, nurses learned enough information. All the questions a nurses might give answer, could specify the exact symptoms of diabetes type 2. They learned to provide first aid for hypoglycemia. For the nurses themselves, it was a surprise to easily answer questions. Changing knowledge about the prevention and complications of type 2 diabetes. They learned how to prevent and care for diabetic foot. According to the

nurse participants, they also reported that they are ready to teach patients and their relatives self-care.

5.3 Nurse participants' feedback on the educational program

As for the evaluation of the respondents' opinion of the program, most of them felt very good or good about participation. In addition, judging by the open responses, participants have established partnerships with responsible nurses. However, some of them wanted to conduct training sessions every six months, and therefore more effective methods of intervention should be explored in the future. In addition, nurses also considered the program necessary for patients, which further indicates the usefulness of the program. The educational program has had a positive impact on nurses' awareness. Development work has shown that the educational program has improved the knowledge of nurses about type 2 diabetes. It also increased the initial efforts of nurses to engage self-care patients living with type 2 diabetes. The responses of nurses taken from interviews reported that individuals had a better understanding of their role in the educational program, and nurses provided examples of positive experiences in improving care for patients with type 2 diabetes. The focus group interviews, which lasted between 50 and 70 minutes (median=60), were printed on a Word document, transcribed interview pages of 8 pages, 12 font and line spacing of 1.15.

6. Discussion

The results of pre- and post-testing showed that the knowledge of nurses on an outpatient basis began to increase, and nurses realized the importance of training to replenish knowledge on type 2 diabetes. The level of knowledge of nurses about managing diabetic patients was quite good. After the intervention of the Educational program on type 2 diabetes, the level of knowledge of health workers increased. (MakkiAwouda, Elmukashfi & Hag Al-Tom, 2013).

The result shows that educational intervention has had a significant positive effect on patients with type 2 diabetes. (Persell, Keating, Laandrum, Landan, Ayanian & Borbas, 2004).

A 2017 study in Thailand tested the effectiveness of the nursing Administration program to prevent diabetes of Buddhist monks in Thailand. The experimental group demonstrated that after receiving the program, they had significantly higher health outcomes and lower clinical results than before receiving the program. (Chaimai, Piaseu & Mekwiwatanawong, 2017).

Educational intervention effectively increased the knowledge and confidence of key nurses in putting content into practice. (Cook, Gillespie, Kronk, Daugherty, Moody, Allen, Shebesta & Falcone, 2013, 108-118).

Educational intervention has improved the knowledge of nurses, which can contribute to safer nursing care. (Machado, Veiga, Ferreira, Martins, Atila & Gimenes, 2018).

This thesis work shows that the elements that make up this program are sufficient for admission to the program aimed at improving the professional competence of nurses caring for people with diabetes. The expected benefits are the development of evidence-based skills, as well as increased professional confidence in nursing care. The results of this work indicate the benefits of educational intervention and continuous training of nurses on type 2 diabetes. Since self-care is one of the main activities that lead to diabetes control, self-care education programs can positively

affect patients' ability to control diabetes and improve self-care skills among these patients.

6.1 Limitations of Development work

It was challenging to apply Benner's model to this development work and educational program because the five stages are poorly defined in the literature, and some evidence from nursing practice obtained in support of their existence is weak. Also, establishing the validity of the stages is a difficult issue, requiring more quantitative data, which is lacking in this case. The results can only be applied in a given situation or to others with similar characteristics, rather than being generalized to a wider range of learning environments.

6.2 Ethical issues in development work

This work was carried out in the framework of the master's degree project in nursing, which highlighted the voluntary nature of participation, the opportunity to leave the interview without explanation, and anonymity of data. All participants gave their oral consent after receiving oral information about the project and how the classes will be held. Oral permission was received from the chief physician of the clinic to conduct their work. Nurses were also reminded that the results ~~pre-post~~ after testing are confidential and will not affect their work in the polyclinic.

7 Conclusion

The results of this project showed that educational intervention on the principles of self-management in type 2 diabetes changed the knowledge of nurses about type 2 diabetes in outpatient care. The results also showed that the educational program can increase knowledge about type 2 diabetes, which can lead to better training of nurses, patients, and their relatives. Furthermore, it can reduce readmission of patients with type 2 diabetes.

Self-control education plays an important role in the care of diabetes. This educational program created here can strengthen the self-control of the patients because it increased the level of knowledge of the nurse who can now support the self-management of the patients better.

The program can be used to care for patients with type 2 diabetes also for health care workers, and the program serves as a training program for students enrolled in medical institutions. Nurses can provide collaboration to multidisciplinary teams to ensure health promotion for the prevention of type 2 diabetes in this population. Further research is needed on the increased participation of clinics and hospitals in different samples and in different locations to test the type 2 diabetes programme.

In the future, the educational program created here should develop further to improve the knowledge of nurses in Kazakhstan.

More type 2 diabetes nurses need to be trained to better provide nursing care. Not only nurses of polyclinics, but also to train nurses working in hospital wards, tutors of medical institutions. This educational program can be conducted as an elective subject for graduating students.

References:

- Ahmed, A., Jabbar, A., Zuberi, L., Islam, M. & Shamim, K. 2012. Diabetes related knowledge among residents and nurses: a multicenter study in Karachi, Pakistan. *BioMedCentral*, 12(18).
- Algenstaedt, P., Stumpenhagen, A. & Westendorf, J. 2018. The Effect of *Morinda citrifolia* L. Fruit Juice on the Blood Sugar Level and Other Serum Parameters in Patients with Diabetes Type 2. *Evidence-Based Complementary and Alternative Medicine*. 1-10. <https://doi.org/10.1155/2018/3565427>.
- Al-Maskari, F., El-Sadig, M., Al-Kaabi, J., Afandi, B. & Nagelkerke, N. 2013. Knowledge, attitude and practices of diabetic patients in the United Arab Emirates. *PLoS One*, 8(1).
- American Diabetes Association. 2013. Economic costs of diabetes in the U.S. in 2012. Published online May 23, 2013. *Diabetes Care*, 36, 1033-46. 10.2337/dc12-2625
- Batmanabane, V. & Kfoury, J. 2017. Qualitative data collection interviews March 2nd 2017. Retrieved 5.2.2019 https://trp.utoronto.ca/students2016/wp-content/uploads/sites/11/2016/09/Interviews-JK_VB-V7-March-1.pdf.
- Bowen, M. & Rothman, R. 2010. Multidisciplinary management of type 2 diabetes in children and adolescents. *Journal Multidisciplinary Healthcare*, 3, 113–124.
- Burke, S. & Sherr, D. & Lipman, R. 2014. Partnering with diabetes educators to improve patient outcomes. *Diabetes Metabolic Syndrome and Obesity*, 7, 45-53.
- Chaimai, A., Piaseu, N. & Mekwiwatanawong, C. 2017. Effects of Nursing Case Management of Buddhist Monks at Risk for Type 2 Diabetes: A Randomized Controlled Trial. *Pacific Rim International Journal of Nursing Research* 21(4), 305-316.
- Chan, M. & Zang, Y. 2007. Nurses' perceived and actual level of diabetes mellitus knowledge: results of a cluster analysis. *Journal Clinical Nurse*, 16, 234-42.
- Clarke, V. & Braun, V. 2013. Teaching thematic analysis: Overcoming challenges and developing strategies for effective learning. *The Psychologist*, 26(2), 120-123.
- Collaborators- Yang, W., Dall, T., Halder, P., Gallo, P., Kowal, S. & Hogan, P. 2013. Economic Costs of Diabetes in the U.S. in 2012. *Diabetes Care*, 36(4), 1033–1046.
- Davies, A. & Buxton, C. 2015. Professional Nurses' Knowledge level on Type II Diabetes Mellitus at Selected teaching and Training Hospitals in the Central Region of Ghana. *Journal of Nursing & Care*, 4, 1-6.
- Dilshad, M. & Latif, M. 2013. Focus Group Interview as a Tool for Qualitative Research: An Analysis. *Pakistan Journal of Social Sciences*, 33, 191-198.
- Duncan, I., Birkmeyer, C., Coughlin, S., Li, Q., Sherr, D. & Boren, S. 2009. Assessing the value of diabetes education. *Diabetes Education*, 35, 752–60.
- El-Deirawi, K. & Zuraikat, N. 2001. Registered nurses' actual and perceived knowledge of diabetes mellitus. *Journal for Nurses in Staff Development*, 17, 5-11.

Funnell, M., Tang, T. & Anderson, R. 2007. From DSME to DSMS: developing empowerment-based diabetes self-management support. *Diabetes Spectrum*, 20(4), 221–226.

[GLOBAL REPORT ON DIABETES](http://apps.who.int/iris/bitstream/handle/10665/204871/9789241565257_eng.pdf;jsessionid=F66E1E833C9E6C90740931A1BDEC7130?sequence=1)

http://apps.who.int/iris/bitstream/handle/10665/204871/9789241565257_eng.pdf;jsessionid=F66E1E833C9E6C90740931A1BDEC7130?sequence=1.

Haas, L., Maryniuk, M., Beck, J., Cox, C., Duker, P., Edwarda, L., Fisher, E., Hanson, L., Kent, D., Kolb, L., McLaughlin, S., Orzeck, E., Piette, J., Rhinehart, A., Rothman, R., Sklaroff, S., Tomky, D. & Youssef, G. 2012. National Standards for diabetes self-management education and support. *Diabetes Care*, 35, 2393–2401.

Hameed, I., Masoodi, Sh., Mir, Sh., Nabi, M., Ghazanfar, Kh. & Ganai, B. 2015. Type 2 diabetes mellitus: From a metabolic disorder to an inflammatory condition. *World Journal Diabetes*, 6(4), 598–612.

Haslam DW, James WP. Obesity. *Lancet* 2005; 366: 1197–209.

Haugstvedt, A., Aarflot, M., Iglund, J., Landbakk, T. & Graue, M. 2016. Diabetes knowledge in nursing homes and home-based care services: a validation study of the Michigan Diabetes Knowledge Test adapted for use among nursing personnel. *BioMed Central*, 15(40). 10.1186/s12912-016-0159-1

Hausken, M. & Graue, M. 2013. Developing, implementing and evaluating diabetes care training for nurses and nursing aides in nursing homes and municipal home-based services. *European Diabetes Nursing*, 10(1), 19–24, <https://doi.org/10.1002/edn.219>.

Healy, S., Black, D., Harris, C., Lorenz, A. & Dungan, K. 2013. Inpatient diabetes education is associated with less frequent hospital readmission among patients with poor glycemic control. *Diabetes Care*, 36, 2960–2967.

Hill, J. 2013. Better Practice normal Development of a diabetes nursing competency framework . *Nurse Prescribing*, 9.

Hollis, M., Glaister, K. & Lapsley, J. 2014. Do practice nurses have the knowledge to provide diabetes self-management education? *Contemporary Nurse*, 46(2), 234–41.

Jan van den Akker . 1999. Principles and Methods of Development Research. Chapter 1.

Jasper, M., Rosser, M. & Mooney, G. 2013. Professional Development, Reflection and Decision-Making in Nursing and Healthcare, 2nd Edition. P.254.

Kasymzhanova, Zh. 2015. https://tengrinews.kz/kazakhstan_news/v-kazahstane-medsestram-peredadut-chast-polnomochiy-vrachey-274654/

Kirkman, M., Briscoe, V., Clark, N., Florez, H. & Haas, L. 2012. Diabetes in older adults. Consensus report. *Journal of the American Geriatrics Society*, 35, 2650–64.

Krall, J., Donihi, A., Hatam, M., Koshinsky, J. & Siminerio, L. 2016. The Nurse Education and Transition (NEAT) model: educating the hospitalized patient with

diabetes. *Clinical Diabetes and Endocrinology*, 2,(1).

<https://doi.org/10.1186/s40842-016-0020-1>.

Krueger, R. 2002. Designing and Conducting Focus Group Interviews, Focus Group Interviewing.

Kusawadee, M., Virat , M., Nisana, T. & Aratchaporn, K. 2014. Effects of telephone counseling in patients taking antibiotics. *Isan Journal of Pharmaceutical Sciences*,10(2).

Laursen, D., Christensen, U. & Frølich, A. 2017. Patients' perception of disease and experience with type 2 diabetes patient education in Denmark. *Scandinavian Journal of Caring Sciences*,31, 1039-1047.

MakkiAwouda, F., Elmukashfi, T. & Hag Al-Tom, S. 2013. Designing an Educational and Training Program for Diabetes Health Educators at Diabetic Health Centers, Khartoum State, Sudan; 2007-2010. *Global Journal Health Science* 5(5), 207–211.

McCulloch, D. 2013. General principles of insulin therapy in diabetes mellitus . Retrieved 5.2.2019. <https://www.uptodate.com/contents/general-principles-of-insulin-therapy-in-diabetes-mellitus#H3539143243>.

Medha, N. 2016. Management of Diabetes in Long-term Care and Skilled Nursing Facilities: A Position Statement of the American Diabetes Association Diabetes Care. *American Diabetes Association*, 39(2), 308-318.

Mendez. C. Ashar Ata, Rourke, J., Greenawalt, D. & Calles-EscandÃ, J. 2016. A Novel Nursing-Driven Standardized Diabetes Education Process in Primary Care. Published online June 21, 2016. *The American Journal of Accountable Care*. Retrieved 5.2.2019. <https://www.ajmc.com/journals/ajac/2016/2016-vol4-n2/a-novel-nursing-driven-standardized-diabetes-education-process-in-primary-care>.

Norris, S., Engelgau, M. & Narayan, K. 2001. Effectiveness of self-management training in type 2 diabetes: a systematic review of randomized controlled trials. *Diabetes Care*,24,561–87.

Machado, J., Veiga, E., Ferreira, P., Martins, J., Atila, E. & Gimenes, F. 2018. Assessment of an educational intervention to improve nurses' knowledge of blood pressure measurement. *Journal of Nursing Education and Practice*, 2(8).

Oyetunde, M. & Famakinwa, T. 2014. Nurses' knowledge of contents of diabetes patient education in Ondo – state, Nigeria. *Journal of Nursing Education and Practice*, 4, 91-98. <https://doi.org/10.5430/jnep.v4n4p91>

Pangi, V., Gudivada, M. & Lashmi, C. 2016. Comparative Study of the Prevalence of Type-2 Diabetes Mellitus in Various Demographic Regions of Andhra Pradesh, India: a Population based Study. *Global Health Journal*,5(2), 103-111.

Peter, J., Hutchinson, A., MacKinnon, M., McIntosh, A., Cooke, J. & Jones, R. 2001. What role do nurse play in Type 2 diabetes care in the community; a Delphi. *Journal of Advanced Nursing*,34 (2),179-188.

Powers,M., Bardsley, J., Cypress, M. & Duker, P. 2016. Diabetes Self-management Education and Support in Type 2 Diabetes: A Joint Position Statement of the

- American Diabetes Association. The American Association of Diabetes Educators and the Academy of Nutrition and Dietetics. *Clinical Diabetes*, 34(2), 70-80, 10.2337/diaclin.34.2.70.
- Persell, D., Keating, N., Laandrum, M., Landan, B., Ayanian, J., Borbas, C. & Guadagnoli, E. 2004. Relationship of diabetes specific knowledge to self-management outcomes. *Preventive Medicine*, 39(4), 746- 752.
- Richey, R. & Klein, J. 2005. Developmental research methods: Creating knowledge from instructional design and development practice. *Journal of Computing in Higher Education* 16, 23-38.
- Robbins, J., Thatcher, G., Webb, D. & Valdmanis, V. 2008. Nutritionist visits, diabetes classes, and hospitalization rates and charges: the Urban Diabetes Study. *Diabetes Care*, 31, 655-60.
- Rubin, D., Moshang, J. & Jabbour, S. 2007. Diabetes knowledge: are resident physicians and nurses adequately prepared to manage diabetes. *Endocrine Practice*, 13(1), 17-21.
- Sabirova, N. 2013. THE LEVEL AND STRUCTURE OF DIABETES IN KAZAKHSTAN AND FOREIGN COUNTRIES. *Scientific-Practical Journal of Medicine Vestnik KazNMU 2*. <https://kaznmu.kz/press/2013/03/15/%D1%83%D1%80%D0%BE%D0%B2%D0%B5%D0%BD%D1%8C-%D0%B8-%D1%81%D1%82%D1%80%D1%83%D0%BA%D1%82%D1%83%D1%80%D0%B0-%D1%81%D0%B0%D1%85%D0%B0%D1%80%D0%BD%D0%BE%D0%B3%D0%BE-%D0%B4%D0%B8%D0%B0%D0%B1%D0%B5%D1%82/>.
- Siminerio, L., Ruppert, K. & Gabbay, R. 2013. Who can provide diabetes self-management support in primary care? Findings from a randomized controlled trial. *Diabetes Education*, 39, 705-13.
- Sindhu, L. & Jayakumar, B. 2017. Effectiveness of Educational Intervention on glycemic control among patients with Type 2 Diabetes Mellitus. *International Journal of Nursing Education*, 4(9).
- Supachaipanichpong, P., Vatanasomboon, P., Tansakul, S. & Chumchuen, P. 2018. An Education Intervention for Medication Adherence in Uncontrolled Diabetes in Thailand. *Pacific Rim International Journal of Nursing Research*, 22(2), 144-155.
- Svenningsson, I., Marklund, B., Attvall, S. & Gedda, B. 2011. Type 2 diabetes: perceptions of quality of life and attitudes towards diabetes from a gender perspective. *Scandinavian Journal Caring Science*, 25, 688-695.
- Unwin, N., Gan, D. & Whiting, D. 2010. The IDF Diabetes Atlas: providing evidence, raising awareness and promoting action. *Diabetes Research Clinical Practice*, 87(1), 2-314.
- Williams, J., Walker, R., Smalls, B., Campbell, J. & Egede, L. 2014. Effective interventions to improve medication adherence in Type 2 diabetes: a systematic review. *Diabetes Manager*, 4(1).
- Benner P. 1982. From Novice to Expert. *The American Journal of Nursing*, 3, 402-407.

Benner P. 2011. From Novice to Expert

[http://currentnursing.com/nursing_theory/Patricia Benner From Novice to Expert.html](http://currentnursing.com/nursing_theory/Patricia_Benner_From_Novice_to_Expert.html)

Doody, O., Taggart, L. & Slevin, E. 2013. Focus group interviews in nursing research: Part 1. *British journal of nursing* 22(1), 16-9.

Cook, R., Gillespie, G., Kronk, R., Daugherty, M., Moody, S., Allen, L., Shebesta, K. & Falcone, R. 2013. Effect of an educational intervention on nursing staff knowledge, confidence, and practice in the care of children with mild traumatic brain injury. *Journal of Neuroscience Nursing* 45(2):108-18

Appendices

Appendix 1. Interview questions.

1. What is experience for you?
2. What do you feel about this training? Your opinions?
3. Adequacy of teaching materials?
4. What was useful? Strengths and weaknesses of learning?
5. What would you suggest?

Appendix 2. Questions for pre-post test

1. What is type 2 diabetes?
2. What are the symptoms of type 2 diabetes?
3. Whether insulin at diabetes is surely necessary 2 types?
4. Can diabetes be cured?
5. What is type 2 diabetes care?
6. Whether it is possible to be engaged in physical activities at type 2 diabetes?

7. What kind of complications are people with diabetes type 2 susceptible to?
8. What is diabetic foot?
9. How can a patient control blood sugar levels?
10. What is hypoglycemia and first aid for hypoglycemia?

Appendix 3. Educational program for nurses

The manual on type 2 diabetes for the nurses working in out-patient conditions.



Author:

1. Abduzhapparova Akbota- Lecture «Turkestan» Multi-Speciality High Medical College.

Contents

1. Introduction	3
2. Diabetes mellitus type 2.....	4
2.1 Emergency care with hypo-and hyperglycemic coma	5
2.2 Self –control	6
2.3 Physical activity and nutrition	7
2.4 Complications	8
2.5 Diabetic foot	9
3. Findings	10
4. Appendix	11

Introduction

People with type 2 diabetes require the inclusion of education in the treatment and care method designed to teach diabetics how they can live and manage their illness on a daily basis. Quality of life, physical activity and a sense of well-being suffers from type 2 diabetics. Consequently, nurses need adequate knowledge about diabetes to provide optimal care for patients or those at risk for the disease. In this regard, trained nurses play an important role in empowering patients to better control diabetes through self-care and improve the quality of life of these patients, providing them and their families with the necessary information and advice. Nurses, among other health workers, have a close relationship with patients all around the world and play a crucial role in improving the outcome of patients. The manual is developed for the nurses working in out-patient conditions. For the purpose of increase in competence and improvement of leaving and health of patients with type 2 diabetes.

Diabetes mellitus type 2.

Diabetes mellitus type 2 is a long-term metabolic disorder that is characterized by high blood sugar, insulin resistance and relative insulin deficiency. Common symptoms include increased thirst, frequent urination, and unexplained weight loss.

Reasons

At emergence at the person of diabetes of the reason of this fact can be various. Quite often lead to the second type of a disease:

- wrong diet;
- lack of physical activity;
- excess weight;
- heredity;
- stresses;
- self-treatment by medicines, for example, glucocorticosteroids;

In fact, not one prerequisite, but the whole complex of the reasons quite often takes place.

If to consider developing of a disease in terms of pathogenesis, then diabetes 2 types is caused by a relative lack of insulin blood. So the state when protein the insulin produced by a pancreas becomes inaccessible for the receptors of insulin located on cellular membranes is called. As a result of a cage opportunities to acquire sugar (glucose) that leads to a lack of supply of cages with glucose and also that is not less dangerous, to accumulation of glucose in blood and its adjournment in various fabrics lose. By this criterion non-insulin-dependent diabetes differs from DM of the 1st type at which the pancreas produces not enough insulin.

Symptoms

Symptoms of the disease largely depend on the stage of the disease. At the first stages, the patient may not feel serious discomfort, with the exception of increased fatigue, dry mouth, increased thirst and appetite. This condition is usually attributed to the wrong diet, chronic fatigue syndrome, stress. However, in fact, the cause is hidden pathology. As the disease progresses, symptoms may include:

poor wound healing,

weakening of immunity

pain and swelling in the limbs,

headaches,

dermatitis.

However, patients often do not interpret even a set of similar symptoms correctly, and diabetes develops unimpeded until it reaches incurable stages or results in life-threatening conditions.

<https://www.youtube.com/watch?v=X9ivR4y03DE>



2.1 Emergency care with hypo-and hyperglycemic coma.

The hypoglycemia which is usually called hypo arises when glucose level in blood falls too low (usually lower than 4 mmol/l). The hypoglycemia usually arises only at people who accept insulin or certain types of tablets with the lowered glucose content in blood. It is important to treat in due time hypo to prevent falling of level of glucose in blood.

Hypoglycemia reasons:

- *a delay, absence or a lack of carbohydrates at meal time*
- *unplanned physical activity or heavier physical activities, than usually*
- *alcohol intake*
- *it is too much insulin or too many diabetes pills.*

Hypoglycemia symptoms:

- trembling and/or sweating
- dizziness and/or headache and/or dizziness
- pricking in lips, language and/or fingers
- heartbeat
- hungry hunger
- insufficient concentration and/or changes of mood and/or unusual behavior.

First aid.

At consciousness violation:

- in case of loss of consciousness of the patient it is necessary to lay sideways, to clean an oral cavity of the patient;
- in/in introduction of 20-40% of glucose of 0.2 ml/kg to a recovery from a coma, the termination of spasms (usually up to 80-100 ml).
- at consciousness restoration — quickly acquired carbohydrates through a mouth.

At preservation of violations of consciousness, spasms

— drop introduction of 5% of glucose on the way in a hospital.

Hyperglycemic coma.

The hyperglycemic coma is a pathological state which develops at having diabetes at a lack of insulin. In blood at the same time concentration of glucose sharply increases and toxic products of a metabolism collect,

hyperglycaemia occurs when the levels are too high (usually above 15 mmol/l).

Causes of hyperglycaemia:

- not enough insulin or diabetes tablets
- eating too much carbohydrate food
- sickness or infection
- stress
- reduced physical activity.

Symptoms of hyperglycaemia:

- excessive thirst
- lethargy
- frequent urination
- blurred vision
- lack of concentration
- change in behaviour (usually irritable).

First aid.

- To give to the patient lying situation;
- To exempt a thorax from the constraining clothes;
- To watch that language did not sink down;
- To enter insulin of short action;
- To control pressure and as necessary (with strongly reduced pressure) to take the drugs for increase in pressure;
- Plentiful drink.

2. 2 Self-control.

Self-control is the analysis of some parameters in the home: self-determination of blood sugar and urine levels, ketone bodies (acetone) in the urine, measurement of weight and blood pressure.



The value of the results received at self-checking in house conditions much higher as they reflect your state in the conditions of real life. Results of the measurements of level of glucose in blood taken in policlinic or a hospital, also as measurement in these conditions of arterial blood pressure, can be untrue.

The choice of food.



Healthy eating for type 2 diabetes is about losing weight and preventing dangerous spikes in blood sugar.

Make smart food choices. Choose a wide variety of foods from the five food groups: bread, cereals, rice, pasta and noodles; fruit; vegetables and legumes; dairy; meat and alternatives.

Portion size matters. Need to match your energy intake (food and drink eaten) with your energy output (exercise/activity). Eating too much, even healthy foods, can lead to weight gain making it hard to manage your diabetes. Eat regularly through the day. Start the day with breakfast and don't skip meals. If you're taking insulin or diabetes tablets you may need to eat snacks in between, but discuss this with your dietitian. Eat more fibre. Fibre helps control blood glucose levels, cholesterol and weight. It also helps keep the digestive system healthy. Good sources of fibre can be found in wholegrain cereals, bread, fruit, vegetables and legumes. Include carbohydrates at each meal. Carbohydrate foods are an important source of fuel for your body. When they are digested, they break down to form glucose in your blood. The best way to include carbohydrates in your diet is to spread them evenly over the day so that your energy levels remain steady and you don't experience big spikes in your blood glucose. Try to choose low GI carbohydrate foods. Glycaemic index (GI) measures how fast a carbohydrate food affects blood glucose levels. High GI foods can cause a rapid rise in blood glucose levels. Low GI foods cause a slower rise in blood glucose (if you watch your portion sizes). Be wary – some high fat foods – such as chocolate, ice cream and toasted muesli – have a low GI, but this doesn't mean they're healthy. Limit the sometimes/extra foods. Foods like chocolate, pastries, pizza, biscuits, cakes and soft drinks contain carbohydrates, but are often high in energy and low in essential nutrients. Eat them only occasionally or in small amounts.

Healthy carbohydrate foods Breads and cereals All types of bread or flat bread and rolls – multigrain/wholegrain, wholemeal and white cereals such as cereal flakes, wheat flake biscuits, porridge/rolled oats, muesli (untoasted/toasted), flour (white and wholemeal). Grains such as rice (Basmati, Moolgiri, Doongara), cous cous, polenta, barley, bulgur noodles and pasta. Fruit Most types including juice, fresh, dried and tinned fruit, e.g. apples, oranges, peaches, bananas, and melons. Milk products or dairy alternatives All types of milk (fresh, long-life and powdered), yoghurt (full cream, low fat), soy drinks (calcium fortified). Vegetables Starchy vegetables – sweet potato, potato, sweet corn, taro, yam and all legumes. (e.g. baked beans, chickpeas).

Limit ‘extra’ foods Biscuits, pies, pastries, cakes, dairy desserts, custard, ice cream, lollies, chocolate, soft drink, flavoured waters, chips and some alcohol drinks.

Blood Glucose Monitoring

Checking your blood glucose levels several times a day helps understand how body responds to medications, exercise, and the foods eat. When first starting out, keeping glucose within a tight margin can often feel like hitting a moving target. It can suddenly spike with no reason or plummet the next day despite total adherence to your treatment.

But, over time, will begin to get an intuitive sense of what causes these changes, whether it be stress, a certain type of carb, or excessive physical activity. To help in quest, keep daily records of glucose levels

including notes about what ate, when ate, and the types of activities engaged in. Within a short period of time, these insights will guide in making the right choices and avoiding the triggers that can lead to blood glucose fluctuations.



Self-monitoring includes blood glucose meter and matching test strips, and Lancet. Your nurse will help you learn how to check your blood glucose at home and how to interpret the results.

Regular monitoring and review of your blood glucose levels will assist you to:

- become more confident managing your diabetes
- better understand the relationship between your blood glucose levels and the amount of exercise you do, your diet and other lifestyle factors such as travel, stress, illness and medication
- understand how your lifestyle choices and medication can make a positive difference
- identify the highs (hyperglycaemia) and lows (hypoglycaemia) and help you make important decisions, such as treating a hypo or seeking medical advice if you are sick

- know when it is appropriate to involve your diabetes health care team for advice regarding medication or insulin adjustments, meal, snack and exercise planning.

Weight management

Following a long-term, balanced eating plan and adding regular physical activity into your life are great ways to manage your weight. It is important to get help from your diabetes health care team to work out the combination of treatment, eating plan and activity that best suits your needs and lifestyle.

Managing your weight . It's not just the scales that reflect your weight – it is also the size of your waist. Health professionals recommend that men have a girth below 94cm and women below 80cm – although different ethnic groups have different recommended measurements. You can work out your true waist measurement by finding the halfway point between your lowest rib and the top of your hip. If you find it difficult to measure yourself, ask for help. People with a high waist measurement are more likely to have high blood pressure, high cholesterol, sleep apnoea and dementia, as well as some cancers. Being overweight also puts pressure on joints – such as your hips, knees and back, which makes physical activity more difficult.

Body mass index (BMI) The best way to determine whether you are in a healthy weight range is to measure your BMI. This is calculated by dividing your body weight in kilograms by your height in metres squared.

Body Mass Index (BMI) (kg/m²)

Waist circumference	BMI category		
	Normal 18.5–24.9 kg/m ²	Overweight 25–29.9 kg/m ²	Obese class I 30–34.9 kg/m ²
Men: < 102 cm Women: < 88 cm	Least risk	Increased risk	High risk
Men: ≥ 102 cm Women: ≥ 88 cm	Increased risk	High risk	Very high risk

BMI formula = Weight (KG) ÷ Height (Metres²).

Control of blood pressure.

High blood pressure can lead to many complications of diabetes, including diabetic eye disease and kidney disease, or make them worse. Most people with diabetes will eventually have high blood pressure, along with other heart and circulation problems.

Diabetes damages arteries and makes them targets for hardening, called atherosclerosis. That can cause high blood pressure, which if not treated, can lead to trouble including blood vessel damage, heart attack, and kidney failure.

What Should Your Blood Pressure Be?

Readings vary, but most people with diabetes should have a blood pressure of no more than 130/80.

The first, or top, number is the "systolic pressure," or the pressure in your arteries when your heart squeezes and fills the vessels with blood. The second, or bottom, number is the "diastolic pressure," or the pressure in your arteries when your heart rests between beats, filling itself with blood for the next contraction. When it comes to preventing diabetes complications, normal blood pressure is as important as good control of your blood sugar levels.

2.3 Physical activity and nutrition.

Regular physical activity in type 2 diabetes is one of the most important components in the management of type 2 diabetes. To be physically active means to perform an action that speeds up the heartbeat and respiration compared to the rest.

Every day physical activity for 10-20 minutes. It can be any kind of physical activity, even the most simple, such as walking, cleaning, gymnastics or dancing to your favorite music. Physical activity helps to maintain the target glucose levels in the normal, energizes, good mood and helps to control weight. All these are the key points of managing type 2 diabetes.



Prior to physical activity.

The most acceptable and safe program of physical activity is physical exercises of light and then moderate intensity. If a person living with type 2 diabetes starts from scratch, their duration should gradually increase from 5-10 to 45-60 minutes.

The need for regular exercise. They should be done at least three times a week:

It is necessary to consult with a specialist before starting physical exercises.

- *Do not forget about the possible risks associated with physical activity (as hypoglycemia).*
- *Keep a glucose tablet or other fast carbs (sweet drink, candy) in case the blood glucose level drops.*
- *Wear comfortable shoes.*
- *Perform a warm-up before training.*
- *Do not overload, start slowly.*
- *Before and after exercise, check your legs for injuries, ulcers and blisters.*
- *Before the exercises, as well as during and after them, do not forget to drink more water.*

Types of exercises for type 2 diabetes:

- Walking at a brisk pace.
- If sedentary work, get up, warm up and walk at least once an hour.
- Play with your children in outdoor games.
- Do not use the Elevator, walk up the stairs.
- A lot of walking in the fresh air.
- Daily knead the main muscle groups (legs, chest, back, arms).

Exercise in type 2 diabetes can lower blood glucose levels. Exercise helps to control your weight, reduce blood pressure, keep stress levels under control and reduce the risk of heart disease.

https://med.vesti.ru/wp-content/uploads/2018/10/shutterstock_554191972.jpg



Choice of food. Selection of a wide range of foods from five food groups: bread, cereals, rice, pasta and noodles; fruits; vegetables and legumes; dairy products; meat and alternatives.

Serving size matters. It is necessary to match energy consumption (eating and drinking) with energy output (exercise/activity). Too much food, even healthy food, can lead to weight gain, making it difficult to manage diabetes.

Eat regularly throughout the day. Start the day with Breakfast and do not miss a meal.

Eat more fiber. Fiber helps control blood glucose, cholesterol, and weight. It also helps maintain digestive health. Good sources of fiber can be found in whole grains, bread, fruits, vegetables and legumes.

Include carbohydrates in every meal. Carbohydrate products are an important source of fuel for the body. When they are digested, they break down, forming glucose in the blood. The best way to include carbohydrates in your diet is to distribute them evenly throughout the day so that your energy level remains stable and your blood glucose levels don't rise.

Try to choose foods with a low carbohydrate glycemic index. The glycemic index measures how quickly carbohydrate food affects blood glucose levels. High glycemic index products can cause a rapid increase in blood glucose levels. Low glycemic index food causes a slower rise in blood glucose. Be careful-some foods high in fat – such as chocolate, ice cream, and toasted muesli have a low glycemic index, but that doesn't mean they're healthy.

Limit sometimes / additional products. Foods such as chocolate, pastries, pizza, cookies, cakes and soft drinks contain carbohydrates, but are often high in energy and low in essential nutrients. Eat them only occasionally or in small quantities.

✓ Permitted products



mushrooms



meat



fish



egg



vegetables

✗ Prohibited products



fruits



grains



bread



potato



candy

2.4 Complications

Improper management of blood sugar levels for an extended period of time can lead to problems with the organs, and in this case, complications may occur. Because diabetes directly affects blood vessels and nerves, no part of the body is protected from deterioration and even complete failure.

Complications of diabetes caused by improper behavior and control include the following:

Heart disease;

Stroke;

Amputation-usually the lower limbs (legs and feet);

Vision loss;

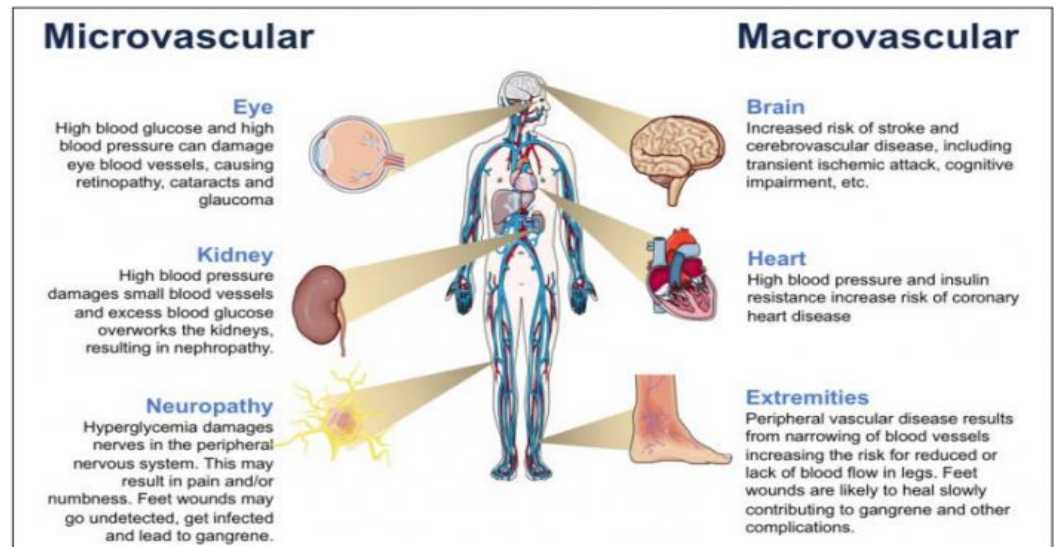
Hearing impairment;

Bladder and kidney infections;

Erectile dysfunction and impotence.

Diabetes is associated with both microvascular and macrovascular diseases affecting several organs, including muscles, skin, heart, brain and kidneys.

Vascular Complications of Diabetes



Microvascular Complications:

Complications include eye damage (retinopathy) leading to blindness, kidney damage (nephropathy) leading to renal failure, and nerve damage (neuropathy) leading to impotence and diabetic foot disorders (which include severe infections leading to amputation).

Diabetic retinopathy (eye diseases)

Diabetic retinopathy is a leading cause of blindness and disability. This is caused by a small damage to the blood vessels of the posterior layer of the eye, retina, which leads to progressive loss of vision, even blindness.

Nephropathy (kidney disease)

Diabetic kidney disease is also caused by damage to small blood vessels in the kidneys. This can cause kidney failure and eventually lead to death.

Neuropathy (nerve disease)

Diabetes causes nerve damage through a variety of mechanisms, including direct hyperglycemia damage and decreased blood flow to the nerves by damaging small blood vessels. This nerve damage can lead to sensory loss, limb damage and impotence in diabetics. These are the most common complications of diabetes.

Macrovascular Complications:

Macrovascular complications include cardiovascular diseases such as heart attacks, strokes, and insufficiency of blood flow to the legs.

Cardiovascular disease

Hyperglycemia damages blood vessels through a process called "atherosclerosis," or blockage of the arteries. This narrowing of the arteries can lead to a decrease in blood flow to the heart muscle (causing a heart attack), or to the brain (leading to a stroke), or to the limbs (leading to pain and reducing the healing of infections).

2.5 Diabetic foot

One of the common complications of diabetes is the defeat of the feet ("diabetic foot"). It develops as a result of changes in nerves and blood vessels with a chronic increase in blood sugar.

Complications in the diabetic foot are mainly caused by the triad of ischemia, diabetic neuropathy and infection.



At diabetic foot disturb:

- excessive formation of calluses, a thickening and reshaping of the nails;
- fungal damage to nails and skin;
- numbness of the feet, a feeling of "goose bumps" and other skin sensitivity disorders;
- changing the shape of the foot.

Diabetic foot is the most common cause of lower limb amputation in about 70% of all cases.

Foot care

1. Regular monitoring and registration of blood glucose levels.
2. Do not smoke.
3. Maintain a healthy diet and regular physical activity.
4. Wash your feet every day with warm water and mild soap.
5. Dry your feet well, especially between your toes (use a soft towel).
6. Avoid dry, chapped skin by applying a moisturizer, especially on the heels, but not between the toes. If the skin is cracked, consult your doctor or nurse about how to treat it.
7. Check your feet every day and call your doctor/ nurse at the first signs of redness, swelling, prolonged pain, numbness or tingling.
8. Use a mirror to check your feet if you can't easily reach or see them.
9. Do not treat calluses, corns without first talking to a doctor or nurse, and do not use corn pads or ointments.
10. Cut the nails straight across to avoid ingrown toenails, and use a nail file to remove sharp edges after cutting. If patients with type 2 diabetes cannot see for themselves or reach their feet properly to trim their toenails, ask someone to help them.

<https://www.youtube.com/watch?v=DASvmFJeYX8>

What should not be done at diabetic foot:

- Not to wear tight and inconvenient shoes.
- Not to go barefoot, not to wear "open" shoes.
- Not to use chemicals or plasters for removal of callosities. Not to delete a callosity independently, the expert has to delete them.
- Not to soar legs

- At timely and correct leaving it is possible to avoid amputation of legs.

Findings

In this tutorial, the authors have tried to find the most accessible forms of presentation of rather complex material.

The manual is conceived as the self-instruction manual. Each section briefly presents a specific theoretical material in an accessible form.

The authors believe that this presentation and arrangement of the material will contribute to its better assimilation.

This manual will help nurses to seize knowledge of type 2 diabetes, to prevent and carry out prevention of a disease. The authors hope that the manual will cause nurses' interest in preventing the disease will awaken in their approach to the development of new knowledge.

The manual is intended mainly for nurses, students of medical colleges and universities. It can also be useful for teachers, supervisors. The authors will be grateful to the readers for comments and suggestions on how to improve the content of the textbook, and in the form of presentation.

References

1. RICHARD I.G. HOLT MA, MB BChir, PhD, FRCP, FHEA, CLIVE S. COCKRAM MB BS, BSc, MD (Lond), FRCP, FRACP, FHKAM (Med), ALLAN FLYVBJERG MD, DMSc, BARRY J. GOLDSTEIN MD, PhD, «Textbook of Diabetes».
2. <file:///C:/Users/User/Desktop/diabetes-queensland-type2-what-you-need-to-know-english.pdf>
3. Jane McClinchy, Principal Lecturer, University of Hertfordshire, Hatfield, Hertfordshire. *British Journal of Community Nursing*. 2018 Vol 23. «Dietary management of older people with diabetes».
4. Beverley Meaney, RGN, NN St. Martins Haemodialysis Unit, Beaumont Hospital. 2012. *Journal of Renal Care*. «DIABETIC FOOT CARE: PREVENTION IS BETTER THAN CURE».
5. Hélio José Coelho Junior. School of Physical Education, University of Campinas, Iris Callado Sanches Human Movement Laboratory. 2017. «Multicomponent Exercise Improves Hemodynamic Parameters and Mobility, but Not Maximal Walking Speed, Transfer Capacity, and Executive Function of Older Type II Diabetic Patients».
6. Abdulfatai B. Olokoba, Olusegun A. Obateru, and Lateefat B. Olokoba. 2012. *Oman Medical Journal* «Type 2 Diabetes Mellitus: A Review of Current Trends».
7. Sheri R. Colberg. 2010. *Diabetes Care* «Exercise and Type 2 Diabetes».

Appendix

1. Have you ever determined your blood glucose (sugar) levels are above normal (during clinical examination, professional examination, during illness or pregnancy)?

- a) No - 0 points
- b) Yes - 5 points

2. Have you ever taken regular blood pressure medications?

- a) No-0 points
- b) Yes-2 points

3. Your age:

- a) up to 45 years – 0 points
- b) 45-54 years – 2 points
- C) 55-64 years – 3 points
- d) Over 65 years – 4 points

4. Do you exercise regularly (30 minutes every day or 3 hours during the week)?

- a) Yes-0 points
- b) No - 2 points

5. Your body mass index (weight, kg: (height, m)² = kg / m²):

- a) Below 25 kg / m²-0 points

"Sweet disease." What organs attacks diabetes

- b) 25-30 kg / m² - 1 point
- C) More than 30 kg / m²-3 points

6. How often do you eat vegetables, fruits or berries?

- a) every day – 0 points
- b) Not every day-1 point

7. Your waist circumference (measured at navel level):

Men Women

- a) less than 94 cm Less than 80 cm - 0 points
- b) 94-102 cm 80-88 cm - 3 points
- C) more than 102 cm more than 88 cm - 4 points

8. Did your relatives have type 1 or type 2 diabetes?

- a) No-0 points
- b) Yes, grandfather/grandmother, aunt/uncle, cousins, brothers/sisters – 2 points
- C) Yes, parents, brother / sister, own child-5 points

Results

Less than 12 points — you are in good health and you must continue to lead a healthy lifestyle.

12-14 points-you may have a pre-diabetes. You should consult with your doctor how you should change your lifestyle.

15-20 points-you may have pre-diabetes or type 2 diabetes. It is advisable to check your blood sugar level, change your lifestyle. It is possible that you will need drugs to reduce blood sugar.

More than 20 points — in all likelihood, you have type 2 diabetes. You should check your blood sugar level and try to normalize it, change your lifestyle. You will need medications to control your blood sugar levels.

(The author-the compiler Kuzina S. "Diabetes". Moscow, 2017).